MYCOTAXON

ISSN (print) 0093-4666 (online) 2154-8889 Mycotaxon, Ltd. ©2018

January–March 2018—Volume 133, pp. 1–7

https://doi.org/10.5248/133.1

A vulnerable thelephoroid fungus, *Lenzitopsis oxycedri*, on *Cupressus sempervirens* in Algeria

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Abstract—*Lenzitopsis oxycedri*, a white rot basidiomycete, is reported in Algeria for the first time, collected in the protected reserve of Zeralda, near Algiers, on living *Cupressus sempervirens*, a previously unrecorded host. More than 50 years after the original description of the species (from a Moroccan specimen), this is the second report from North Africa.

Key words—*Cupressaceae, Juniperus*, *Thelephorales*, southern Mediterranean, wood-decay fungus

Introduction

Lenzitopsis oxycedri was described by Malençon & Bertault (1963), based on a specimen collected on *Juniperus oxycedrus* L. from the Moroccan Rif in North Africa. The specimen was characterized by perennial, resupinate to effuse reflexed basidiocarps, a monomitic hyphal system, and globose to subglobose finely warted basidiospores, yellow to pale brown in KOH. This original description supported the segregation of *Lenzitopsis* Malençon & Bertault as a monotypic genus in *Thelephorales*.

Malençon & Bertault (1963), who described both macro- and microscopic characteristics of the species in detail, provided a Latin diagnosis. However,

Table 1. Published and herb. MA-fungi records of *Lenzitopsis oxycedri*

Year	Country	*Juniperus* sp.	Altitude (m)	Records	Reference
1963	Morocco	*J. oxycedrus*	900	1	Malençon & Bertault (1963)
1979–1980	Spain	*J. oxycedrus* *J. thurifera*	750–1050	3	García-Manjón & Moreno (1981)
1982	Morocco	*Juniperus* sp.	1360	1	Tellería (1984)
1986–2006	Spain	*J. oxycedrus* *J. thurifera* *J. phoenicea*	620–1460	22	herb. MA-Fungi
1991	Spain	*J. thurifera*	1050	1	Ryvarden (1991) – neotype
2000	Italy	*J. oxycedrus*	850	2	Bernicchia (2000)
2003	Turkey	*J. foetidissima*	1400	2	Doğan et al. (2007)
2005	Turkey	*J. foetidissima*	1100–1200	2	Doğan et al. (2011)
2010	Macedonia	*J. foetidissima*	1200	3	Karadelev et al. (2013)

because the holotype specimen on which their description was based had been lost, Ryvarden (1991) considered both genus and species as invalid, proposing instead *Lenzitella malenconii* Ryvarden as a gen. & sp. nov. [both mistakenly designated as "nom. nov."] and designating a Spanish specimen on *Juniperus thurifera* L. as holotype. This reassignment of names was later challenged by Stalpers (1993), who stated:

> "*Lenzitopsis* has been considered as invalidly published because no type species was indicated (Art. 37.1), and *L. oxycedri* because it was published in an invalidly published genus. However, *Lenzitopsis* was published with one species only, which was newly described and thus the description of *L. oxycedri* meets the conditions for a descriptio generico-specifico (Art. 42.1) and thus both genus and species are validly published."

Today, *Lenzitopsis oxycedri* is the accepted name, with *Lenzitella malenconii* regarded as a superfluous homotypic synonym, and Ryvarden's (1991) designation of a Spanish "holotype" and "isotype" is corrected to "neotype" and "isoneotype."

The records of *L. oxycedri,* summarized in Table 1, show that this species has been reported from only five countries in >50 years.

According to Malençon & Bertault (1963), *L. oxycedri* has small discrete basidiocarps, which make it easy to overlook. The authors reported the species

on *J. oxycedrus* at a single site in the Moroccan Rif; later examinations of *J. oxycedrus* and *J. thurifera* in the Rif and the Middle Atlas failed to find other occurrences (Malençon & Bertault 1963). *Lenzitopsis oxycedri* has been reported as either a saprobe or a parasite, exclusively on *Juniperus* spp. (Malençon & Bertault 1963; García-Manjón & Moreno 1981; Tellería 1984; Ryvarden 1991; Bernicchia 2000; Doğan & al. 2007, 2011; Karadelev & al. 2013). Here we report the first record of *L. oxycedri* in Algeria, growing on *Cupressus sempervirens* L. (Mediterranean cypress), a previously unknown host tree.

Materials & methods

Lenzitopsis oxycedri was collected in April 2017, in two different sites within the protected reserve of Zeralda, near Algiers, Algeria: (1) from *Cupressus sempervirens* ("*fastigiata*"), growing in a mixed stand of *Quercus ilex* L., *Quercus suber* L., and *Pistacia lentiscus* L.; (2) from *C. sempervirens* ("*fastigiata*" and "*horizontalis*") in a pure stand of Mediterranean cypress. Both sites are located around an artificial lake. Ecological data were noted, in both sites, for habitat description.

Identification was based on macro- and microscopic observations on fresh basidiomata, following the descriptions of Malençon & Bertault (1963), Ryvarden & Gilbertson (1993), Doğan & al. (2007), and Pérez Gorjón & Bernicchia (2008). Macromorphological characters were observed using a Leica S8AP0 stereomicroscope. Microscopic detailed analysis was performed using an Optika T3-I5A scientific microscope equipped with a Moticam-2000 camera. Basidiospores were examined in Melzer's reagent. Measurements were performed using Mycomètre free license software. The studied material is conserved at the University of Tartu Herbarium, Estonia (TU).

Taxonomy

Lenzitopsis oxycedri Malençon & Bertault,
Bull. Soc. Mycol. Fr. 79: 82 (1963) Figs 1–5

Type: Spain, Guadalajara, Tamajón, on living *Juniperus thurifera*, 26 Apr. 1991, leg, G. Moreno & L. Gonzaga (Neotype, ALC; isoneotype, O; designated by Ryvarden 1991).

= *Lenzitella malenconii* Ryvarden, Syn. Fung. 5: 174 (1991)

Basidiocarps lignicolous, perennial, adnate, resupinate to pileate, flexible when fresh, brittle and fragile when dry, 3–5 cm wide, and 5–7 mm thick. Pileal surface dark brown with a narrow clear margin, sub-zonate, glabrous and black when old; Hymenophore thick 3–10 mm, lamellate, lenzitoid, lamellae raduloid, incised, subulate or sinuous with toothed margin, at first yellowish, then ochraceous to brown with accumulated spores, cracked when old, sides with yellowish stromatic projections. Context whitish, corky, dry, soft, fragile, thin, covered with a spongy black cortex; Spore deposit brown.

Figs 1–4. *Lenzitopsis oxycedri* on *Cupressus sempervirens* (TU124571 & TU124572). 1. Pileate basidiocarps. 2. Resupinate basidiocarps. 3. Subzonate pileus. 4. Yellowish stromatic projections.

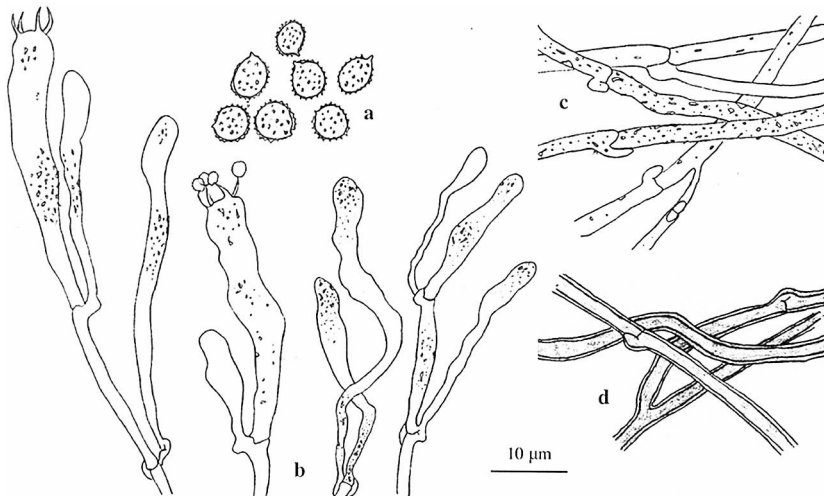

Fig. 5. *Lenzitopsis oxycedri* (TU124571 & TU124572).
a. Spores. b. Basidia and basidioles. c. Context generative hyphae. d. Pileus generative hyphae.

Hyphal system monomitic, generative hyphae fibrous, intersecting, pale brown in pileus, hyaline elsewhere, 2.5–5 µm diam, moderately branched, thin-walled, in age with brown crystals that turn to bluish-green in KOH. Cystidia absent; Basidia tetrasporic, clavate then elongate to sinuous, tube-like, 40–77 µm long, clamped at base; Basidiospores globose to subglobose, pale brown, thick-walled, finely warted, predominantly with small inamyloid inner pigment crystals, 5.7–7.5 × 4.6–7.5 µm.

Habitat—Growing >2 m above the ground on bark, branches, and cracks of living *Cupressus sempervirens*, at 49-80 m altitude, uncommon, known only from two sites within a protected reserve.

Specimens examined: **ALGERIA**, **Algiers**, **Protected Reserve of Zeralda**, growing at the base of branches of living *Cupressus sempervirens* ("*fastigiata*"), 4 Apr. 2017, leg. S. Aouali (TU124571); growing on trunks and branches of living *C. sempervirens* ("*fastigiata*" and "*horizontalis*"), 11 Apr. 2017, leg. S. Aouali (TU124572).

Comments—Dai & al. (2007) recorded four collections of *Lenzitella malenconii* [= *Lenzitopsis oxycedri*] from widely separated localities in China; however, these were subsequently described as a new species, *Lenzitopsis daii* L.W. Zhou & Kõljalg, which differs from *L. oxycedri* by its annual basidiocarps, amyloid spores, and LSU-rDNA sequence analyses placing it in a well-supported separate clade (Zhou & Kõljalg 2013). These authors stated that the position of

Fig. 6. Geographical distribution of *Lenzitopsis oxycedri* records.

Lenzitopsis is not yet resolved as either *Thelephoraceae* or *Bankeraceae*, the only two families currently accepted in *Thelephorales* (Kirk & al. 2008).

The geographical distribution of *L. oxycedri* (Fig. 6) is limited to the Mediterranean basin, particularly along the northern shore, from Spain, Italy, Macedonia and Turkey. This species has been reported to grow as a saprobe or parasite, and causing white rot on four *Juniperus* spp. (Table 1). Our report of this wood-decaying fungus in Algeria expands its distribution in the southern side of the Mediterranean, where it grows on living *Cupressus sempervirens*, at much lower altitudes (49–80 m) than all previous records (620–1460 m). This new host species suggests new perspectives for further mycological studies in areas characterized by the presence of other *Cupressaceae*, on which the fungus could potentially grow. Ecological data from the different habitats where *L. oxycedri* has been recorded should be compared, to clarify its chorology.

Acknowledgements

We would like to thank Leif Ryvarden and Alessandro Saitta for reviewing this article. We also thank Lei Cai for constructive comments on a previous draft of the manuscript. The authors gratefully thank the forestry staff of the Protected Reserve of Zeralda, for their help and for offering all logistical tools in conducting the field observations. L. Pecoraro acknowledges CAS 153211KYSB20160029 for supporting his research at Chinese Academy of Sciences.

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